



Stroke and Its Relation with Dyslipidaemia – 100 Case Studies

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KEYWORDS

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Risk factors.

ABSTRACT:

Background: Stroke is a leading cause of morbidity and mortality worldwide, particularly among the elderly. Dyslipidaemia is a well-recognized and modifiable vascular risk factor with a well-established role in coronary heart disease, but its contribution to stroke remains less well documented in our setting.

Methods: This observational study was carried out in the medicine and neurology departments of Dhaka Medical College Hospital, Dhaka, from July to December 2008. A total of 100 stroke patients admitted during this period were consecutively enrolled. Detailed history, clinical examination, and relevant investigations were performed. Lipid profile was measured before initiation of lipid-lowering therapy. Data were collected using a predesigned questionnaire and analyzed in frequency and percentage.

Results: Male predominance was noted with a male-to-female ratio of 2.55:1, and most patients were above 60 years of age. Hypertension was present in 68% of cases, and 32% were obese by waist circumference. Only 33% of stroke patients had optimal LDL levels; the remaining 67% had borderline to very high LDL, among whom 47% suffered ischemic stroke. Elevated total cholesterol was observed in 44% of patients, with 38% of them having ischemic stroke. Low HDL was present in 30% of cases. Overall, ischemic stroke accounted for 74% of cases compared to 26% hemorrhagic stroke, with ischemic stroke showing stronger correlation with dyslipidaemia, especially elevated LDL.

Conclusion: Dyslipidaemia is highly prevalent among stroke patients and demonstrates a significant association with ischemic stroke. Routine lipid screening and timely management may help reduce the burden of stroke in our population.



Introduction

Acute stroke is characterized by the rapid appearance (usually over minutes) of a focal deficit of brain function due to non traumatic vascular pathology, most commonly a hemiplegia with or without signs of focal higher cerebral dysfunction (such as aphasia), hemi sensory loss, visual field defect or brain–stem deficit [1].

Stroke is a major health hazard in both developed and developing countries. It is third highest cause of mortality after cancer and ischemic heart disease [1]. Among all the neurological diseases of adult life, only the cerebrovascular disease clearly ranks first in frequency and importance. At least 50% of neurological disorders in a general population are of this type [2].

The mortality and morbidity of stroke is related to age. Stroke incidence rate rises exponentially with increasing age with a hundred fold increase in rates from 3 per 1000 population in the 3rd and 4th decades to almost 300 in 8th and 9th decade [3].

Stroke is a preventable disease rather than curable one. There are many recognized risk factors such as hypertension, diabetes, smoking, heart disease, dyslipidaemia and others. So for primary prevention of stroke, risk factors identification is essential [4]. Developed countries were able to take necessary measures for early detection and control of these risk factors and thus stroke incidence rate is declining day by day. In USA the decline was began since 1970 [3]. The annual decrease has been 5% per year. But these risk factors are paying less or no attention and not properly controlled in developing country like us. For these reasons, the incidence of stroke is more in our country than developed countries. Even in BIRDEM, Dhaka, 5.87% of the admitted patients were suffering from stroke [5].

Dyslipidaemia is an essential risk factor for atherosclerotic disease (e.g. Coronary Heart Disease, stroke & peripheral arterial disease). In United States 40% patients of ischemic stroke suffer from dyslipidaemia in association with other risk factors [6]. It is a modifiable risk factor. Now a day a various lipid-lowering drugs are available. So, early detection of dyslipidaemia and appropriate measures can prevent stroke and its morbid outcome in a number of patients.

The objective of this study is to evaluate the prevalence of dyslipidaemia among stroke patients and to identify the incidence of other associated risk factors.

Methodology & Materials

This observational study was conducted among hospitalized patients in different wards of the medicine and neurology departments of Dhaka Medical College Hospital, Dhaka, from July 2008 to December 2008. The total sample size of the study was 100 stroke patients. The study population consisted of one hundred stroke patients admitted to the department of neurology and department of medicine during the study period. Inclusion criteria were patients presenting with acute or recurrent stroke, with blood samples collected before starting any anti-lipid drug. Exclusion criteria included patients dying before recording the information, patients and or party refusing to give consent to take part under the study, and patients who were already on anti-lipid drugs. Case sampling was done consecutively, and informed written consent was obtained from all participants. Medical history was taken from each patient with emphasis on finding out the relations of stroke with dyslipidaemia. Thorough physical examination, especially neurological examination and examination of the cardiovascular system, was carried out. All relevant information from history, clinical findings, and investigation results were recorded in a pre-designed questionnaire and data collection sheet. The main tool of the study was serum lipid profile, which was done in the laboratory by spectrophotometric principle using the “RA-50 Chemistry Analyzer.

Results

Table I: Age distribution according to sex (n=100)

Age	Male	Percentage	Female	Percentage
<20	04	04%	0	0%
20-29	0	0%	0	0%
30-39	04	04%	02	02%
40-49	14	14%	06	06%
50-59	12	12%	08	08%



>60	38	38%	12	12%
Total	72		28	

Table I shows male predominance. Male Female Ratio is 2.55:1. Majority of the patients are above 60 years of age.

Table II: Hypertension as a risk factor for stroke (n=100)

Blood pressure	No. of Patient	Percentage
Normotensive	32	32%
Hypertensive	68	68%

Table II shows that 68% stroke patients were hypertensive.

Table III: Physical finding of Dyslipidaemia (n=100)

Points	No. of Patient	Percentage
Waist Circumference Male>40inch & Female>35inch	32	32%
Xanthelesma	4	4%
Tendon xanthoma	1	1%
Arcus lipidus	10	10%
Locomotor brachii	9	9%

Table III shows that 32% were obese by measuring waist circumference. Other findings are less remarkable.

Table IV: Showing relation of elevated LDL with stroke (n=100)

LDL Level (mg/dl)	No. of Patient	Percentage	Type of Stroke
Optimal < 100	33	33%	H - 2 I - 31

Near Optimal 100 - 129	25	25%	H - 2 I - 23
Border Line High 130 - 159	32	32%	H - 18 I - 16
High 160 - 189	8	8%	H - 2 I - 6
Very High ≥ 190	2	2%	H - 0 I - 2

(H-Hemorrhagic, I-Ischemic)

Table IV shows only 33% of stroke patients had optimal LDL level. 25% had near optimal, 32% had border line high, 8% had high and 2% had very high LDL level. Among the other 77% stroke patients (who did not have optimal LDL level), 47% had ischemic stroke.

Table V: Showing relation of elevated total cholesterol with stroke (n=100)

Total Cholesterol (mg/dl)	No. of Patient	Percentage	Type of Stroke
Desirable < 200	56	56%	H - 20 I - 36
Border Line High 200 - 239	30	30%	H - 4 I - 26
High ≥ 240	14	14%	H - 2 I - 12

(H-Hemorrhagic, I-Ischemic)

Table V shows 44% of all stroke patients have elevated total cholesterol level. Out of them 38% are ischemic stroke.

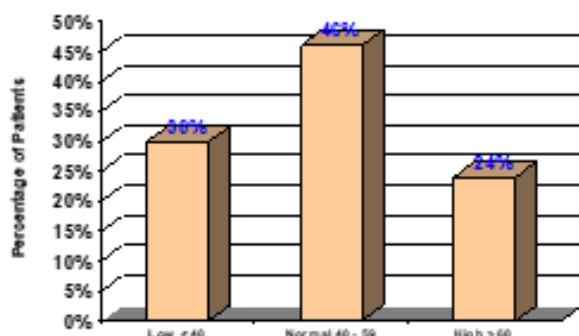


Figure 1: Pattern of HDL levels in all Stroke patients

Figure 1 shows that 30% of all stroke patients have low HDL level. 46% of all stroke patients have normal and 24% of all stroke patients have high HDL level.

Table VI: Pattern of stroke observed (CT confirmed) (n=100).

Type	No. of Patient	Percentage
Ischemic	74	74%
Hemorrhagic	26	26%

Table VI shows 74% were ischemic and 26% Hemorrhagic stroke

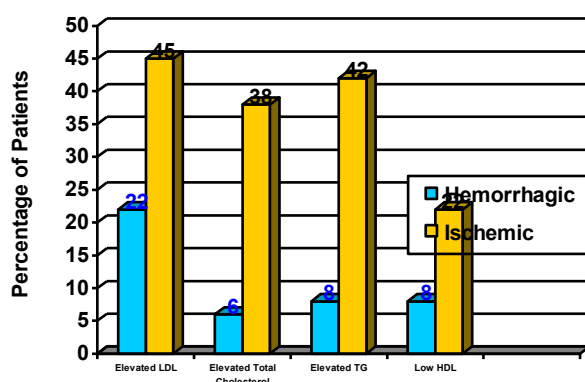


Figure 2: Pattern of all strokes in patients with dyslipidaemia

Figure 2 shows ischemic stroke has strong correlation with dyslipidaemia than hemorrhagic stroke and especially with elevated LDL.

Discussion

Hundred stroke inpatients were studied. It was an observational study. The inpatients were selected from department of medicine and department of Neurology, Dhaka Medical College Hospital, Dhaka.

Majority of the patients in this study were of age above 50 years (70%). Four cases were found below 20 years. In the present study the frequency of stroke increased with increasing age. One study showed 34% patients are in the 6th decade and 27% in the 7th decade with an age range of 26-84 years [7]. Bell et al. studied 51 patients with cerebrovascular disease, the age range of the patients were 17 to 84 years with majority of them between 50-69 years [8]. In another study highest percentage (37.51%) of patients were in the sixth decade [9]. These observations are similar with the present study.

In this study 72% of the stroke patients were male and 28% were female. The ratio was 2.55: 1. Sarker CB et al. found that the male female ratio was 3.21: 1 [10]. Haque A et al. showed that the male female ratio was 4: 1 [11]. Bost ML et al. showed that the male female ratio was 1.24: 1 [12]. First two studies were done in our country, third in abroad. The sex ratio may differ from other study as female patients get less medical privilege in our country in male dominant society.

In this study 68% of cases were hypertensive. So hypertension is a major risk factor for stroke. In a study in BIRDEM by Latif et al. showed that 50.30% of NIDDM patients with stroke were hypertensive⁵. Quaraishi had shown that 58% of acute CVD had hypertension [13]. Like others, this study also showed significant correlation between stroke and hypertension.

Dyslipidaemia is an essential risk factor for stroke. But interestingly patient of dyslipidaemia shows little physical findings (e.g. xanthelesmia, tendon xanthoma). In this study 32% were obese (Calculated by waist circumference), 4% had xanthelesma, 1% had tendon xanthoma, 10% had arcus lipidus and 9% had locomotor brachii.

In this study 44% of the stroke patients were found elevated total cholesterol. In MRFIT study it was found that a clear relationship emerged when stroke was



categorized into ischemic and hemorrhagic types, the risk of ischemic stroke increasing with total cholesterol concentration [14]. The Honolulu Heart Program also found a continuous and progressive increase in thromboembolic stroke rate with increasing cholesterol levels [14,15].

Among individual lipoproteins, high TG had strong association with stroke. In this study 50% of the patients had elevated serum TG level. David Tanne et al. showed that high blood TG (over 200mg/dl) had a nearly 30% higher risk of suffering a stroke, after taking into account other risk factors for stroke such as high BP, DM or cigarette smoking [16]. At the same time 30% of stroke patients showed low HDL level. It reveals patients of metabolic syndrome suffered more from stroke. Dr. Haralampos Milonis found that the prevalence of the metabolic syndrome was significantly higher in stroke patients [14]. Increased serum LDL level which is a major risk factor for coronary heart disease (CHD) showed good association with stroke patients. In this study 67% of stroke patients had elevated serum LDL level, among them 45% had ischemic stroke.

In this study 74% were ischemic and 26% were hemorrhagic stroke. Jovanovic Z. found 77.34% ischemic stroke, 20.12% ICH and 2.54% SAH [17]. In this study ischemic stroke showed strong correlation with dyslipidaemia. Patients of high serum LDL, total cholesterol and triglyceride suffered from ischemic stroke 45%, 38% and 42% respectively which also correlate with other studies performed at home and abroad.

Limitations of the study

This study has some limitations. It was conducted in a single hospital with a relatively small sample size of 100 patients, which may not represent the broader community. The observational design cannot establish causality, and some potential confounding factors, such as dietary habits or prior use of lipid-lowering drugs, may not have been fully controlled. Therefore, the findings should be interpreted with caution and validated by larger, multicenter studies.

Conclusion

Stroke is a common cause of morbidity and mortality especially in the elderly. In this small study only 100 stroke patients were studied. This may not reflect the

exact situation of the disease in the community, but its proximity to the reality cannot be under estimated. Among all other risk factors dyslipidaemia is one of the most important and treatable factors. The role of dyslipidaemia in CHD is well established.

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Conflicts of interest

There are no conflicts of interest.

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